

Rapid NEXAFS Imaging with Magnetic Projection Lens

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The large area rapid image analysis tool (LARIAT) provides full-field, partial electron yield NEXAFS imaging with an extreme field of view and depth of field, accomplished through the use of a magnetic projection lens. Two independently-controlled high temperature superconducting magnets are used to shape the magnetic field within the detector. The high magnetic field (up to 8.5 T) confines photoelectrons to helical orbits about the magnetic field lines. With this lens system, all electrons with any momentum in the magnetic field direction may be collected by the detector. Electron energy discrimination is implemented using gridless electrostatic lenses. Electron images are collected using a 16 megapixel CCD camera. The extremely high collection efficiency provided by this lens design permits the rapid collection of data, with collection times limited by the CCD readout in many instances. The design and operating principles of the LARIAT microscope will be discussed.